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A Way to Find of The Hard to-Reach and Risky Locations Arrhythmia Focus: Double Coronary Guidewire Mapping Technique

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During electrophysiological study and ablation, intracardiac recordings using catheters are important for the diagnosis and treatment of complex arrhythmia. Accessing some locations of the heart such as left ventricle summit and epicardial coronary arteries using routine catheters are difficult and risky. In this report, it was presented a case of successful left ventricle summit ventricular tachycardia (VT) ablation with an irrigated catheter using the new mapping technique namely "Double Coronary Guidewire Mapping Tchnique" described by Yildiz M [(1)].

A young male patient was admitted antiarrhythmic drugs resistant ventricular tachycardia. He had previous failed ablation using three-dimensional system with the NavX™ (St Jude Medical) in the another arrhythmia center for several years ago. The surface electrocardiogram revealed premature ventricular contraction (PVC) with positive precordial concordance (Figure 1A). The transthoracic echocardiogram showed mild decreased left ventricle ejection fraction (45%). The endocardial radiofrequency ablation (RFA) was planned and the epicardial RFA was offered to patients as a second choice but the patient refused to undergo epicardial RFA. During electrophysiological study, the same PVCs were seen and the earliest recordings were taken in the distal coronary sinus (CS). The transseptal puncture was performed and the left ventricular propagation mapping was done using HD GridR (AbbottR) catheter (Figure 1B,C). Although the RFA was delivered by irrigated catheter in the area between aortomitral continuity and left ventricle summit, PVC/Nonsustained ventricular tachycardia was reappeared. Then the diagnostic catheters (4F- 6F, respevtively) were tried to map the distal segment of the CS and great cardiac vein but they failed to be advanced through the CS. The two coronary floppy wire were advanced through the CS and they were placed into the great cardiac vein (Figure 1D). The "Double Coronary Guidewire Mapping Technique" was used to get uni- and bipolar noise-free intracardiac signals from great cardiac vein (Figure 1E,F). The inputs in the connection box are connected to the distal tip of coronary guidewires using the recording device (Figure 1G,H.J). The pace-mapping was done in the area of the earliest signals (-39 msn) taken and there was 97% matching with PVCs. The irrigated catheter was advanced through aortic valves retrogradely and it was placed corresponding to the place of the opposite site of the earliest signal point taken by double wires (Figure 1K). The selective coronary angiogram was performed and RFA was applied to the area >5 mm from the coronary artery (Figure 1L). The firing was seen and then PVCs were gone after RFA. After 30 minutes of the waiting period, the intravenous metaproterenol and dobutamine infusion were given and neither PVC nor nonsustained ventricular tachycardia was induced. There were no complications. The medical treatments were stopped and the patient was discharged. Two months after the procedure, the patient does not have any symptoms. The rest surface electrocardiogram and 24 hours electrocardiogram monitoring did not reveal PVC or nonsustained ventricular tachycardia.

The routine electrophysiological catheters as like 4-6 French (1 French is exactly 0.33 mm) used in daily electrophysiological practice that can't reach some difficult and risky locations including left ventricular summit. The coronary guidewires, which are an essential element in interventional cardiology practice; can be useful in the mapping of the hard-to-reach and risky locations because of their small diameters, high torgue response and flexibility, ability to be guided. In this technique, two coronary floppy guidewire (Boston Scientific) (0.014 inches in diameter, combines a hydrophilic-coated polymer sleeve with a soft J tip and flexible body, good torgue response and radiopacity for especially tortuous coronary artery and venous anatomy) were used to obtain uni- and/or bipolar noise-free recordings from difficult and risky locations including left ventricular summit. In conclusion, this technique namely "Double Coronary Guidewire Mapping Technique" can help us on mapping and ablation of difficult locations of the heart.

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References

1. Yildiz M. Technical report: Obtaining noise-free bipolar recordings from different locations of the heart using coronary guidewires. Koşuyolu Heart J 2019;22(2):143-144.

Figure 1A: Premature ventricular contractions were seen on the 12-lead electrocardiography

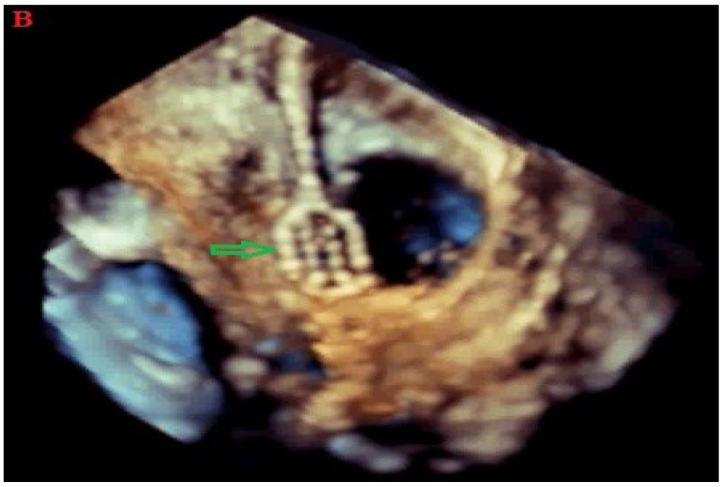

Figure 1B: HD Grid catheter was seen on the real time 3-dimensional transeosaphageal echocardiography (gren arrow)

Figure 1C: HD Grid catheter was seen on the Ensite 3-dimensional mapping system (gren arrow)

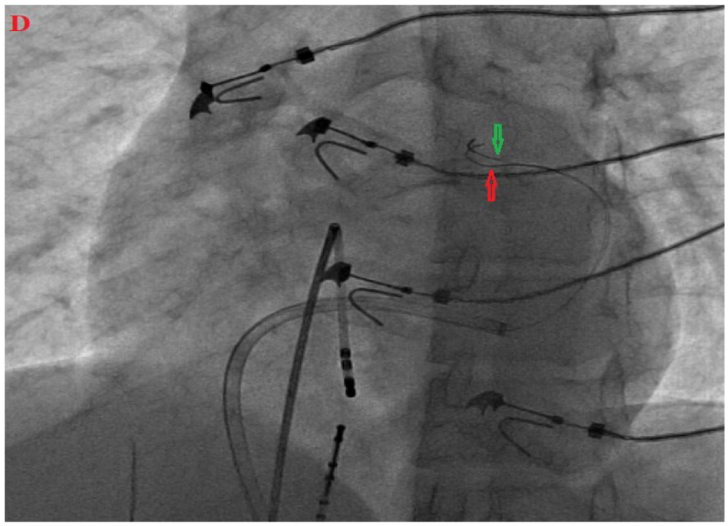

Figure 1D: Two floppy wire (gren and red arrow) were used as a bipolar catheter for mapping the distal of the coronary sinus on the flouroscopic view

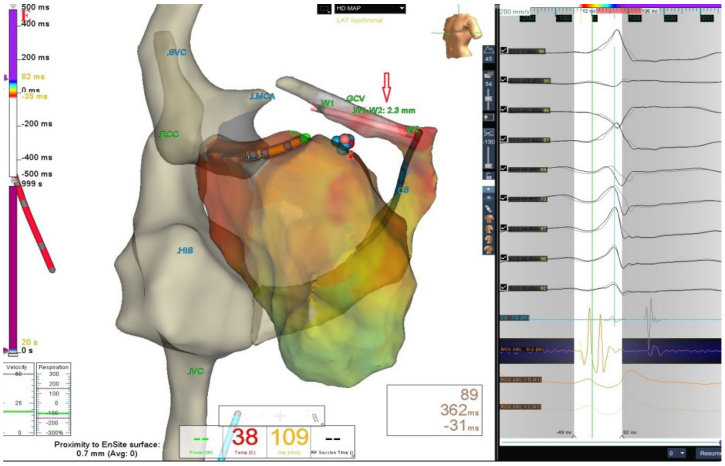

Figure 1E: The Ensite 3-dimensional mapping system shows the anatomy of the left ventricle summit area, double floppy wire (red arrow), intracardiac signals and the ablation point

Figure 1F: Bipolar mapping were seen on Ensite (blue arrow) and intracardiac recording (red arrow)

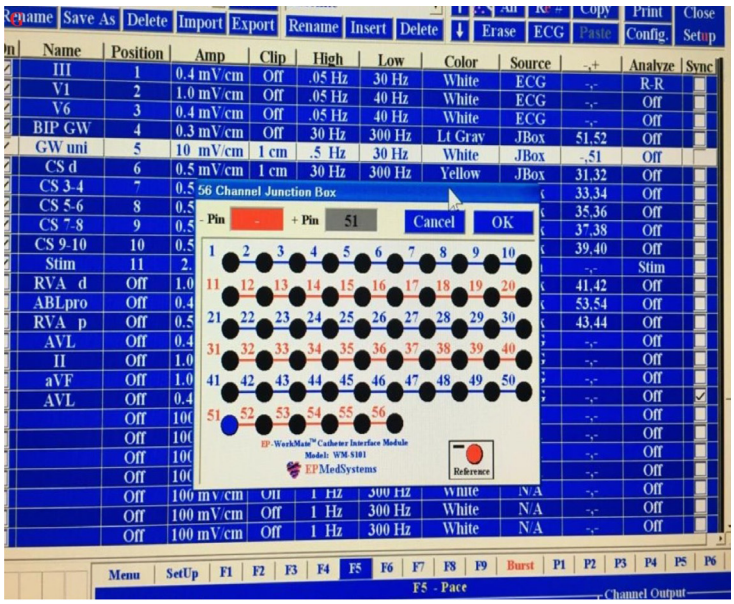

Figure 1G: The monitor of the electrophysiological system

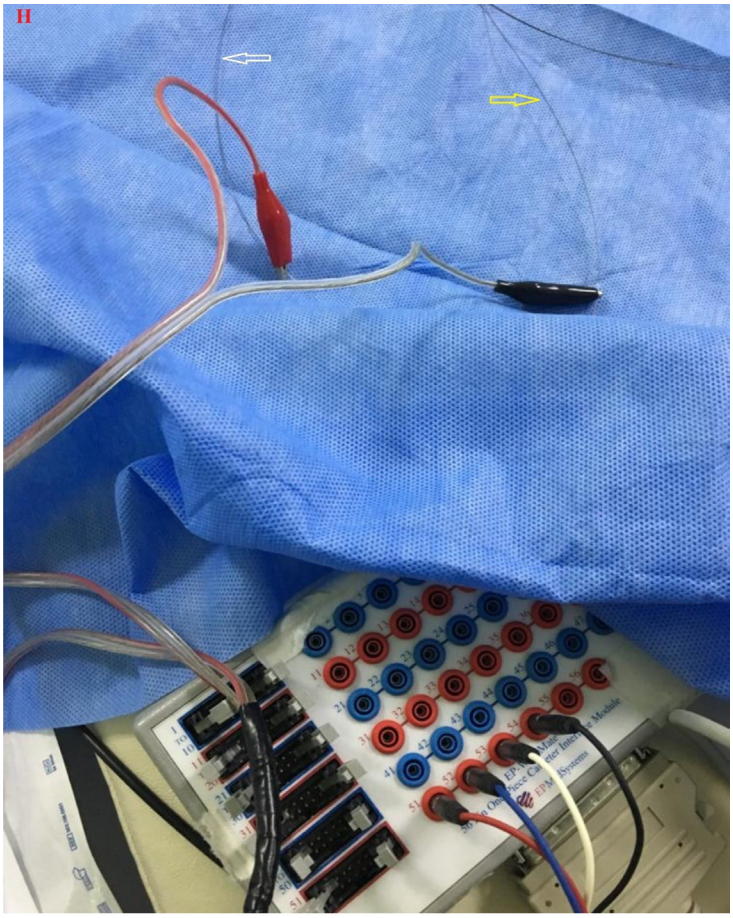

Figure 1H: The inputs of the connection box are connected to the distal tip of coronary guidewires (yellow and white arrow) using the recording device

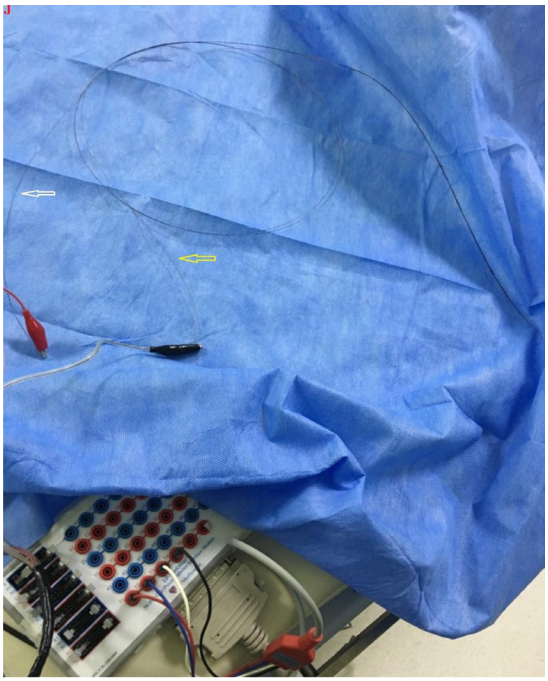

Figure 1J: The inputs of the connection box are connected to the distal tip of whole coronary guidewires (yellow and white arrow) using the recording device

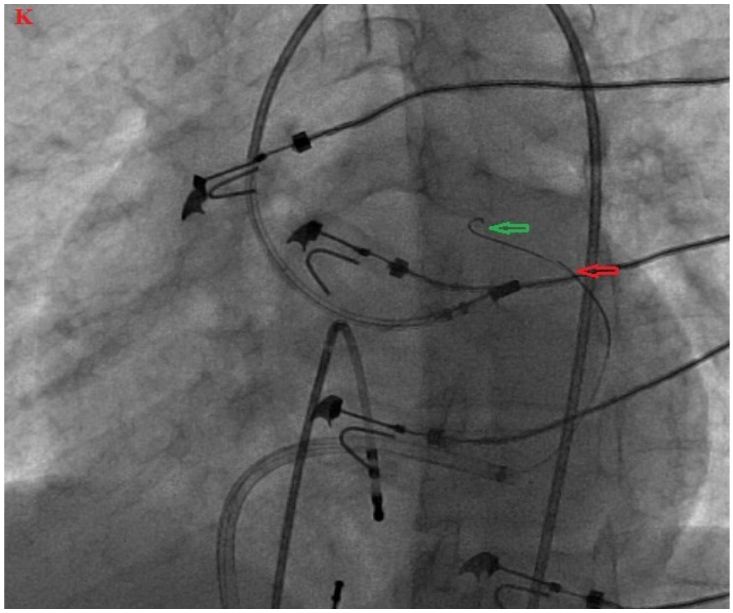

Figure 1K: Two floppy wire were seen close to retrograde ablation catheter on flouroscopy (gren and red arrow)

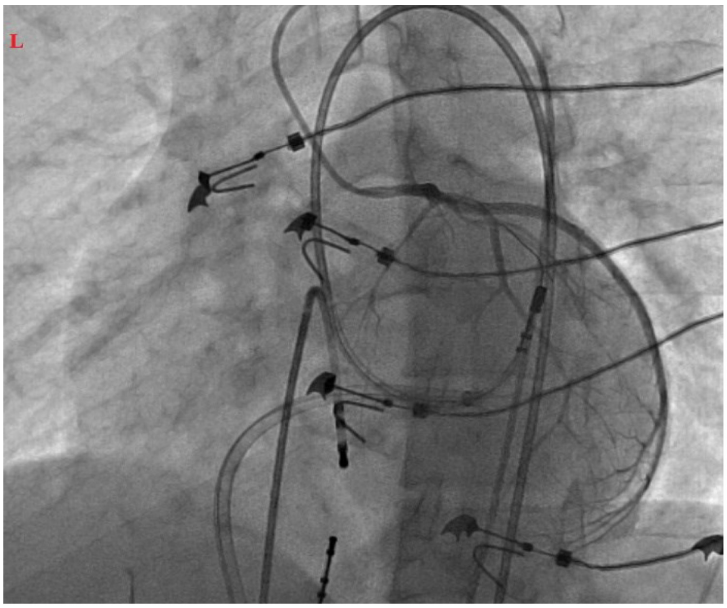

Figure 1L: The selective coronary angiogram was performed and RFA was applied to the area >5 mm from the coronary artery